

**Operating Instructions for ZDZ engines - ZDZ 40 / ZDZ 80**  
**Safety notes and warnings relating to internal combustion engines**

<b>Be sure to read right through the operating instructions before you attempt to run the engine for the first time.</b>
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**This engine is not suitable for young persons under 14 years of age. Young people should only be permitted to operate this engine under the instruction and supervision of an adult who is aware of the hazards involved in this activity.**

- **Model engines may only be used for the purpose for which the manufacturer designed them, i.e. as propulsion units for suitable models.**

**Don't ignore our warnings.** They refer to materials and processes which, if ignored, can result in serious or even fatal injury, or permanent damage to property.

You alone are responsible for the safe operation of your engine.

If you have any questions regarding the safe operation of your engine, please turn to your local model shop in the first instance, as the staff will be pleased to help you.

- Propellers and other rotating parts which are powered by an engine represent a permanent hazard and present a real risk of injury. Don't touch them with any part of your body. For example, a propeller spinning at high speed can easily slice off a finger.
- Keep well clear of the rotational plane of the propeller or rotors. You never know when some part may come loose and fly off at high speed, hitting you or anybody else in the vicinity. Never touch the revolving propeller with any object.
- Every time you intend to operate your engine check carefully that it and everything attached to it (e.g. propeller, rotors, gearboxes etc.) is in good condition and undamaged. If you find a fault, do not run the engine until you have corrected it.
- The engine must always be securely and firmly mounted in the model, in accordance with the manufacturer's recommendations. Use screws of adequate size in conjunction with locked nuts.
- Model engines are usually started with the help of an electric starter. An alternative is to use a "chicken stick" - a length of thick wooden dowel with a piece of water hose pushed over it.
- Many model engines are very noisy, producing a sound level much higher than 85 dB (A), which implies that you should wear ear defenders. Never run an engine without the silencer fitted. Even with a silencer, model engines can easily disturb your neighbours. Don't run your engines when other people expect peace and quiet.
- Take care with loose clothing such as shirt sleeves, scarves etc. Flapping cloth can easily be sucked into the area of the propeller and then get tangled in the blades. This is extremely dangerous.
- If you start your engine when the model is standing on loose or sandy ground, the propeller will suck up sand and dust and hurl it around, and it could easily get in your eyes and do damage. Wear protective goggles at such times.
- Take particular care when carrying the model with the engine running. Keep well clear of the rotating parts!
- Models powered by internal combustion engines are demanding and potentially dangerous machines, and call for a high level of technical knowledge and skill from the operator, together with a responsible attitude. They are capable of generating a lot of kinetic energy - quite enough to cause serious personal injury and damage to property. For this reason never operate your model on public roads, school yards, public parks and playing fields etc., and ensure that you are always in full control of it.
- It is important that you can stop your engine at any time. This is achieved by adjusting the throttle so that the barrel closes completely when you move the throttle stick and trim to their end-points. You may also switch off the ignition.
- If there are passers-by or spectators at your flying site, make sure that they are aware of the dangers inherent in your activity, and insist that they keep a safe distance away (at least 5 m).
- Never run an internal combustion engine without a suitable load.
- When installing the engine it is important to arrange all the controls in accessible positions, in order to minimise the risk of injury through contact with moving parts (e.g. propeller etc.).
- When working on the engine in any way, be sure that you are standing on a stable, non-slippery surface, and that the model is safely secured.
- Model fuels are toxic; do not allow them to come into contact with your eyes or mouth. Fuel should always be stored in clearly marked containers, out of the reach of children.
- Never run an internal combustion engine in an enclosed space such as a cellar, garage etc. Model engines produce lethal carbon monoxide gas just like full-size engines. Engines should only be run in the open air!
- Model fuels are volatile and highly inflammable. Keep them well away from open flames, excessive heat, all possible sources of sparks and anything else which could result in a fire. Do not smoke when handling fuel or where fuel vapours are likely to be present.
- Model engines generate a lot of heat. The engine and silencer in particular become very hot when running, and stay at a high temperature for quite a while. Touching the hot parts can give you serious burns, so take care especially when carrying out adjustments - wear protective gloves. Hot engines can even start a fire under unfavourable circumstances.
- When the engine is running it expels hot toxic gases from the exhaust together with very hot fluid combustion residues which can cause burns.

#### **Maintenance**

Clean the engine after each session. Any unburned fuel must be removed from the fuel tank and engine.

**Check the following points before running the engine:**

- Don't alter the settings or fiddle with adjustor screws on the engine before you have read the operating instructions.
- Don't dismantle the engine or undo any screws.
- If you ignore these points you may find that the engine will not start, does not run properly or fails to produce full power.

#### Key to symbols

Caution! Danger from rotating parts! These can produce serious and even fatal injuries in extreme cases.

Caution! Highly toxic! May cause poisoning.

Caution! Danger of explosion and fire.

Caution! Potential burns through contact with hot surfaces.

Be sure to read right through these instructions and safety notes before operating the engine.

ZDZ two-stroke petrol engines are designed as power plants for large models. Their power : weight ratio is very good, and they are built to high quality standards. Each ZDZ engine is tested and adjusted at the factory before shipping, and this means that major adjustments are hardly ever required.

#### Basic characteristics and notes:

- The engines are equipped with membrane carburettors made by WALBRO or BING. The carburettors feature two needle valves / adjustor screws:
- H for High - full throttle setting
- L for Low - idle setting

The crankshaft is supported in several ballraces; the connecting rods are fitted with needle roller bearings.

- All ZDZ engines are equipped with BRISK UR-17 spark plugs.
- The recommended fuel is unleaded petrol mixed with fully synthetic two-stroke oil at a ratio of 1:40. Suitable oils include Castrol TTS and Bel Ray.
- Always use a fuel tank with a felt or sintered clunk weight such as Order No. 1646, 1646.1 or 6800.5.
- Suitable fuel tubing for use with petrol is available under Order No. 1325.2.

To operate the engine you will also need a four-cell ignition battery with a capacity of at least 800 mAh, together with an ignition switch with integral charge socket (see main catalogue).

Engines are factory-adjusted, i.e. each engine is run briefly before despatch. For this reason please avoid fiddling with the carburettor and the sensor holder, as you will lose the settings.

The ignition system features an auto-OFF funktion, which switches the ignition off automatically after a period of inactivity of around one minute. To switch the ignition on again you must first switch it off, wait a few seconds, then switch it on again. In practice this means: if the engine cuts and stays stopped for longer than a minute, the ignition system switches itself off. To re-start the engine you must switch the ignition off briefly, then switch it on again.

#### When starting and adjusting the engine:

Always wear a thick, stout glove for starting the engine.

First switch on the ignition, close the choke flap and suck in fuel by swinging the propeller. The engine will start to fire (run, then stop) as soon as sufficient fuel has reached the combustion chamber. At this point open the choke flap and start the engine again. You may have to repeat this process several times until the engine is running; this often depends on the length of the fuel line to the carburettor, and whether there is any air in the tube. If the engine is already mounted in a model, it is essential to switch on the radio control system before you start the engine. Check that the throttle stick is at the idle position, and that the carburettor actually is no more than slightly open!

Caution: if you set the throttle too far open for starting, you may find that the model or test stand will start moving as soon as the engine is running! For safety's sake don't run the engine unless you have an assistant close by; alternatively attach the model or test stand securely to the ground.

ZDZ engines generate very high power - depending on the propeller used - and the amount of "pull" may surprise the user unfamiliar with petrol engines. Always wear a thick, stout glove for starting the engine, ensure that the propeller is 100% securely attached, and that the propeller nut is mechanically locked, before you start the engine,

Once the engine is running, let it warm up for a little while before slowly increasing speed towards the full-throttle setting.

Never stand in front of the propeller or directly to one side of it. If you need to adjust the engine or carburettor screws, always do it from behind the propeller, i.e. position yourself behind the model or test stand. Never, ever, attempt to work on the engine from the front by reaching round the propeller. This is exceptionally dangerous!

When you are starting, running and adjusting the engine, ensure that the model, engine or engine test stand are located well clear of loose objects such as cleaning rags, small tools and other unrestrained items, as the propeller generates a powerful suction force.

When the engine has warmed up, rotate the needle valve marked "H" until it is running at maximum speed.

Now throttle the engine back to idle, and adjust the idle range by rotating the needle valve marked "L".

You may find that you need to re-adjust both needles in order to achieve a smooth, even transitional range (mid-throttle settings) as each needle valve affects the other to some extent. When correctly adjusted, the engine should run smoothly when throttled back, without fluctuations in rotational speed; the engine should then pick up speed immediately, without faltering, when the throttle is advanced.

If you fit a different size of propeller, you will usually need to adjust the carburettor settings slightly.

Always use the matching exhaust system and accessories designed for these engines. The recommended items are shown in the New Items 2001 catalogue and the main catalogue.

The ZDZ-Modellmotor / Graupner company guarantees these engines for a period of 30 months, provided that any damage is not caused by unauthorised modifications to the engine, that suitable fuel with the correct oil content (1:50) is used at all times, and that the engine is run using the original ignition system only.

Engines manufactured or distributed by ZDZ-Modellmotor / Graupner are not suitable for propelling manned machines or transport vehicles. If the engines are employed for such purposes, neither Graupner nor the engine manufacturer will accept liability for damage to property or personal injury. ZDZ engines are suitable exclusively for use in radio-controlled models, primarily model aircraft, and their use to transport living creatures is prohibited.

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